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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/519,771

12/17/2004

Silvano Donati

23160

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535 7590 06/17/2008

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EXAMINER

DOBSON, DANIEL G

ART UNIT

PAPER NUMBER

2613

MAIL DATE

DELIVERY MODE

06/17/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/519,771	Applicant(s) DONATI ET AL.	
	Examiner DANIEL G. DOBSON	Art Unit 2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 March 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-42 is/are pending in the application.
- 4a) Of the above claim(s) 1-5 and 8-26 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 6, 7 and 27-42 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 March 2008 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claim 6 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 6, 7, 27-31, 37, and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 5,998,781 to Vawter et al. in view of U.S. Patent 5,029,306 to Bull et al.

As to **Claim 6**, *Vawter* discloses an integrated device for receiving millimeter waves (Fig. 1), the device comprising:

a laser circuit able to generate optical signals (Fig. 1, 14, semiconductor ring laser);

a photodiode circuit (Fig. 1, 16, high-speed photodetector) connected to said laser circuit by means of a waveguide (Fig. 1, laser (14) connected to PD (16) by waveguide (18)),

means for subjecting the optical signals to optical beat to generate first millimeter wave signals in the photodiode circuit (Fig. 3, shows millimeter wave signals produced by the apparatus);

a substrate on which the laser circuit, the photodiode circuit, and the waveguide are integrated (Fig. 1, laser, PD, and waveguide integrated on substrate (12));

Bull discloses antenna terminals able to receive second millimeter wave signals (Fig. 3, 44, Col. 5, ll. 45-50);

contact elements of the photodiode circuit connecting the antenna terminals to the photodiode circuit (Fig. 3, photodiode (42) connected to antenna (44)) so that the second millimeter wave signals are fed to the photodiode circuit via the contact elements and are mixed with the first millimeter wave signals so as to cause an electrical beat between the first and second millimeter wave signals in the photodiode circuit (Col. 5, ll. 51-5.)

Vawter discloses contact pads connected to the photodiode for off chip use of the first millimeter wave signals (Col. 6, ll. 64- Col. 7, ll. 3.) It is further suggested that the generator has applications in communications and radar applications.

Vawter and *Bull* are from the same art with respect to generating a local oscillator signal for RF applications.

At the time of the invention, it would have been obvious for a person of ordinary skill in the art to at the antenna terminals disclosed by *Bull* to the LO generator disclosed by *Vawter*. The device would then be suitable for transmission and reception a millimeter waves.

As to **Claim 7**, *Bull* discloses wherein the second millimeter wave signals comprise a modulating component and the contact elements are adapted to allow extraction of said modulating component as a consequence of the electrical beat between the first and second millimeter wave signals in the photodiode circuit. (Fig. 3, impedance matching network, filters and amplifiers groom the received signal for reception. Col. 5, ll. 30- Col. 6, ll. 3.) The suggestion/motivation is the same as that used in the rejection for claim 6.

As to **Claim 27**, *Vawter* discloses the substrate is a semiconductor material (Col. 4, l. 10.)

As to **Claim 28**, *Vawter* discloses the substrate is GaAs (Col. 4, l. 11.)

As to **Claim 29**, *Vawter* discloses that the laser circuit comprises a laser guide of the ring type (Fig. 1.)

As to **Claim 30**, *Vawter* discloses the laser circuit is adapted to operate in passive mode-locking (Col. 5, l. 67- Col. 6, l. 1.)

As to **Claim 31**, *Vawter* discloses wherein the laser circuit comprises a saturable absorption area (Col. 6, ll. 22-30.)

As to **Claim 37**, *Vawter* and *Bull* disclose an integrated device as defined in claim 7. *Bull* further discloses an electronic circuit connected to the contact elements and able to detect the modulating component (Fig. 3, low-pass filter and amplifier isolate the signal detected and prepare it for further receiver processing.)

As to **Claim 39**, *Vawter* discloses a bias element connected with the contact elements and adapted to apply a bias voltage to the photodiode circuit (Col. 9, ll. 22-4.)

4. Claims 32-36, 38, and 40-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 5,998,781 to *Vawter et al.* and U.S. Patent 5,029,306 to *Bull et al.*, as applied to claim 6 above, and further in view of U.S. Patent 6,348,683 B1 to *Verghese et al.*

As to **Claim 32**, *Verghese* discloses how a device such as that disclosed by *Vawter* can be modified to transmit and receive millimeter waves. Using a coupler (Fig. 1A, 20) allows a copy of the first millimeter wave to be sent to two photodiodes. One is used for transmitting and the other is used for receiving millimeter waves.

At the time of the invention, it would have been obvious for a person of ordinary skill in the art to use another photodiode circuit connected to the antenna elements in the device disclosed by *Vawter* and *Bull*. *Vawter* discloses that more than one output coupler can be used (Col. 6, ll. 33-5.) Accordingly, a person would be motivated to use this coupler to provide another millimeter wave reference signal to achieve transmission at the same time as receiving signals.

As to **Claim 33**, *Verghese* discloses another waveguide connecting the other photodiode circuit to the laser circuit (Fig. 1A.) The suggestion/motivation is the same as that used in the rejection for claim 32.

As to **Claims 34 and 35**, *Vawter* discloses an amplifier circuit on the waveguide (Col. 6, ll. 46-64.) When modifying the device to transmit and receive (*Verghese*) it would have been obvious to use an amplifier on each waveguide. The suggestion/motivation is the same as that used in the rejection for claim 32.

As to **Claim 36**, *Verghese* discloses a coupler able to couple the laser circuit to the first-mentioned waveguide and to the other waveguide. This is suggested by *Vawter*, and a person would be motivated to use this coupler to provide another millimeter wave reference signal to achieve transmission at the same time as receiving signals.

As to **Claim 38**, *Vawter*, *Bull*, and *Verghese* disclose an integrated device as defined in claim 34. *Bull* discloses a second electronic circuit connected to the contact elements and able to detect the modulating component superposed on the received millimeter waves (Fig. 3, low-pass filter and amplifier isolate the signal detected and prepare it for further receiver processing.)

Vawter discloses that the amplifier circuit is able to control the gain through the waveguide. The ability to control the gain of a signal over time is also the ability to impart a modulated signal. Thus, it would have been obvious to modulate the amplifier disclosed by *Vawter* to generate a modulated signal for transmission.

As to **Claim 40**, *Vawter* discloses a bias element connected with the contact elements and adapted to apply a bias voltage to the photodiode circuit

(Col. 9, ll. 22-4.) The suggestion/motivation is the same as that used in the rejection for claim 32.

As to **Claims 41 and 42**, analog and digital modulation is well known in the art, and is commonly used in optical transmission devices with external modulation. Therefore, it would have been obvious to a person of ordinary skill in the art to use an analog or digital signal to be transmitted by millimeter waves.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **DANIEL G. DOBSON** whose telephone number is

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(571)272-9781. The examiner can normally be reached on Mon. - Fri. 8:00 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Vanderpuye can be reached on (571) 272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Daniel G. Dobson/
Examiner, Art Unit 2613

/Kenneth N Vanderpuye/
Supervisory Patent Examiner, Art Unit 2613

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